REMARKS

a. Claim 1

In the Office action claim 1 was rejected pursuant to 35 USC section 103(a) as being obvious over Hunt-Grubbe in view of Groner et al. Claim 1 defines a borehole caliper tool that includes, in pertinent part, a follower arm coupled to a tool body, with the follower arm including a cam, having mass, coupled to reciprocate about a joint and facilitate a displacement of the mass away from the proximity sensor in response to rotation of the follower arm outwardly away from the tool body, with the proximity sensor being positioned to sense displacement of the mass and generate an output containing information of the deflection of the follower arm relative to the tool body.

In the Office action it appears that a tacit admission is set forth that Hunt-Grubbe does not teach displacement of a mass away from a proximity sensor in response to rotation of a follower arm outwardly away from a tool body, with the proximity sensor being positioned to sense displacement of the mass and generate an output containing information of the deflection of the follower arm relative to the tool body. Rather, Groner et al. are alleged to teach "placing the cam mass in such a position that the cam mass moves away from the proximity sensor when the follow arm moves away from the body." See Office Action page 3. The Office Action continues to allege that "it would have been obvious . . . to move the cam mass of Hunt-Grubbe to a position that the cam mass . . . [moves] away from the proximity sensor when the follow arm move away from the body as taught by Groner et al. . . ."

Hunt-Grubbe, however, teaches moving the nose 40 close to the proximity sensor 70 as the rigid caliper arm 32 moves away from the tool body, which is opposite to Applicants' claimed invention. See Fig. 3 of Hunt-Grubbe and accompanying text. This results from the cantilever movement of the rigid caliper arm 32 and contact finger 38 and nose 40 being disposed at opposite ends thereof. See *id.* Moreover, there is no disclosure or suggestion to modify Hunt-Grubbe to include Applicants' claimed features, because Hunt-Grubbe teaches away from having a bow spring mechanism as taught by Applicants. See col. 4, lines 23-25.

Moreover, Groner et al. do not overcome the deficiencies of Hunt-Grubbe. Rather, Groner et al. make clear that the distance between the sensor and the cam 38 must

remain fixed. Assuming, *arguendo*, that push rod 40b is analogous to Applicants claimed sensor, it becomes clear that contact between push rod 40b and cam 38 must be maintained in order to obtain an accurate measurement of a bore diameter. Specifically, Groner et al. employ a mechanical sensor that includes deformation of a plate 42 to record a borehole diameter vis-à-vis transfer rod 50. See lines 67 column, 3 to line 7, column 4. Key to obtaining a proper measurement of the borehole diameter is balancing of opposed spring forces. See *id*. The balancing of spring forces would not occur were cam 38 to become spaced apart from the sensor (push rod 40b). Therefore, it is submitted that the cam 38 in Groner et al. neither moves away from nor toward the sensor (push rod 40b). Rather, the distance between the two is fixed so that changes in spring forces may occur. Based upon the foregoing, Applicants respectfully contend that claims 1 and 21 are not obvious in view of the cited prior art.

b. Claim 11

Claim 11 defines a borehole caliper tool having, in pertinent part, a pad for engagement with a surface of the borehole and a cam pivotally coupled to the pad, the cam having mass and being coupled to reciprocate about the pivot joint to facilitate a displacement of the mass with respect to a proximity sensor in response to contact of the pad with the surface. Hunt-Grubbe does not teach pivotally coupling the pad to the cam. Rather, Hunt-Grubbe teaches that is it desired to have the nose 40 in a fixed spatial relationship with respect to the rounded tip 38. See col. 3, lines 26-37; col. 4, lines 9-13. Specifically, the caliper arm is defined as being rigid and the nose portion is described as serving as a reference point to unambiguously define the position of rounded tip 38. Thus, Hunt-Grubbe teaches away from the claimed caliper tool in which the pad is pivotally coupled to the cam, thereby allowing the relative positions between the two to vary.

Smith et al. do not overcome the deficiencies of Hunt-Grubbe. Assuming that Smith et al. teach having a pad for engagement with a surface of a borehole and a cam pivotally coupled thereto, it is Applicant's position that Hunt-Grubbe teach away of pivotally coupling the pad to the cam for the reasons discussed above. Therefore, there is no suggestion to modify Hunt-Grubbe to include the features of Smith et al. Moreover,

none of the remaining cited references overcome the deficiencies of Hunt-Grubbe. Therefore, Applicants respectfully contend that the invention defined by claim 11 is not obvious in view of the cited art.

c. Claim 21

Claim 21 defines a method for gauging a diameter of a borehole having a longitudinal axis extending transversely to the diameter, the method includes, in pertinent part, moving a tool body having a proximity sensor and an arm assembly along the longitudinal axis. The follower arm has a cam including mass. Displacement of the mass is monitored to determine the magnitude of the bore diameter based upon a magnitude of the displacement. The magnitude of the displacement is inversely related to the bore diameter.

As discussed above with respect to amended claim 1, the mass of the cam is displaced away from the proximity sensor in response to rotation of the follower arm outwardly away from the tool body. This results from the use of the bow spring having the pad proximately centered thereupon. As a result, as the bore diameter becomes smaller, the angle of the follower arm becomes greater resulting in greater displacement of the cam from the proximity sensor. Conversely, as the borehole diameter becomes larger, displacement of the mass from the proximity sensor becomes larger. Thus, the displacement of the mass from the proximity sensor is inversely related to the borehole diameter. Applicants submit that the arguments set forth above with respect to claim 1 apply with equal weight here and as a result the cited prior art does not suggest moving a cam mass away from the sensor as the borehole diameter increases. As a result, there is no suggestion to provide a method of measuring a borehole diameter so that as the borehole diameter becomes larger, displacement of the mass from the proximity sensor becomes larger. Therefore, Applicants respectfully contend that claim 21 is not obvious in view of the cited art.

3. The Non-obviousness of the Dependent Claims

Considering that the dependent claims include all of the features of the independent claims from which they depend, these claims are patentable to the extent that

the independent claims are patentable. Therefore, Applicants respectfully contend that the dependent claims are in condition for grant.

If the Examiner believes that a telephone conference would be advantageous in advancing the issuance of this application, a call to the undersigned at (281) 285-4562 is highly encouraged.

Schlumberger Technology Corporation
Sugar Land Product Center
200 Gillingham Lane, MD #9
Sugar Land, Texas 77478
(281) 285-4562
(281) 285-8821 Fax
Date 21-Jun-06

Respectfully submitted,

Victor H. Segura
Reg. No. 44,329
Attorney for Assignee